

## TRADE AND MACROECONOMIC POLICY: WHAT DOES IT MEAN FOR FARMERS AND LENDERS?

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Macroeconomic policy, exchange rate regimes, international capital markets and trade policy are receiving greater attention as the U.S. economy has become more open and world financial markets have become more closely integrated. Recent international financial crises, on-going world trade negotiations, and uncertain macroeconomic conditions in the U.S. also raise concerns about the effects of macroeconomic and trade policies on incomes and asset values in U.S. agriculture. While the economic impacts of these events have been muted by government transfers to agriculture, macroeconomic and trade policies remain important because of the increasing exposure of the agricultural sector to national and international forces. It is important to recognize that agriculture is quite sensitive to changing exchange rates and interest rates. Consequently, those forces communicate greater volatility to agriculture via commodity and capital markets. As a result, there are several direct and indirect effects of policies that should be considered. We look at the underlying roles of policies and the potential for increased volatility due to stronger linkages between those markets, and the implications for agricultural producers and lenders.

### **Policy Choices in an Open Economy**

In order to explore macroeconomic and trade policies that are pertinent to U. S. agriculture, it is necessary to look at these policies and events in the context of an open economy. With increased globalization of markets, capital mobility has increased across international borders and there has been a gradual opening of the economies, as evidenced by increased trade. "Globalization is like a powerful new medicine," there are large potential benefits but there are also possible side effects (Obstfeld).

#### *An Open Macro Economy*

An open economy is simply an economy that is open to trade. That is, there are flows of capital and commodities into and out of the various national economies in response to changing market forces (e.g., changing interest rates and commodity prices). These flows integrate national economies into a set of interrelated global markets for capital and currencies, commodities, and related factors of production. Today, smoothly functioning international financial markets are an important element of the global market system. By systematically reducing the costs of international transactions (and, thus, lowering a barrier to trade) it has been possible for financial markets to create increased economic efficiency and to facilitate an expansion of trade activity.

One indicator of the openness of an economy is the trade-to-income index. An increase in the trade-to-income index implies greater international linkages between the economy and the rest of the world due to increased trade. The average trade-to-income index for the U.S. increased from 9.4% during 1960-69 to 22.3% during 1990-1999 (Table 1).<sup>1</sup> Although still modest by international comparisons, this suggests a further opening of the U. S. economy in the past 40 years.<sup>2</sup> The comparable trade-to-income index for agriculture is dramatically higher and the trend suggests an even more significant opening of the U.S. agricultural economy.

If a major concern exists over greater openness of the U. S. economy, it is probably that increased openness may lead to a higher degree of domestic financial and economic volatility than would occur if the economy were more insulated. This may be a primary concern, since there exists no early warning system to identify economic crises in the world (Berg and Pattillo). In addition, agricultural producers and lenders may have only limited practical alternatives to hedge those risks. Moreover, interdependence between the U.S. and other major world economies is reflected by the current phase of global economic slowdown. In an international business cycle economies tend to “sink in sync” (The Wall Street Journal).

While the trade-to-income index suggests greater openness in traded commodities, U.S. financial markets have also become more open. Similar measures of the openness of the U.S. financial sector indicate that the U.S. financial sector has become more highly integrated with international capital and money markets (Pederson et al.). The impacts of financial market fluctuations on business activity occur primarily through two channels: changes in the internal net worth of firms and changes in the availability of bank credit (Gertler and Hubbard). In the first channel, financial volatility creates an unexpected change in the level of collateral, a redistribution of wealth, and a change in the level of investment. Via the second channel, financial market volatility creates an unexpected loss of access to bank loans as a source of financing, and the level of investment falls due to reduced liquidity. U.S. agriculture experienced these types of effects in the early and mid-1980s.

### *Macro Policy Fundamentals*

How do we characterize macroeconomic policy choices in an open economy framework? First, we must consider the fact that since 1973 we have operated in a flexible exchange rate system. That is, the exchange rate fluctuates freely in response to changes in the demand for and supply of U.S. dollars in international currency markets. Thus, the dollar is a commodity and the exchange rate is its relative price. The dollar has a nominal price (the nominal exchange rate) and a real, inflation-rate-adjusted price (the real exchange rate). How the real and nominal exchange rates fluctuate is in large part determined by

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1 The U.S. trade-to-income index reflects the sum of U.S. exports plus imports divided by U.S. GDP (Grassman). The U.S. agriculture trade-to-income index reflects the sum of agricultural commodity exports plus imports divided by farm sector GDP.

2 Obstfeld suggests that the U.S. economy remains relatively insular when compared to most smaller economies in the world.

economic conditions in goods markets and capital markets in the U.S. and in the other countries.<sup>3</sup>

First, we consider the role of monetary policy. In a flexible exchange rate system it is possible for the central bank to pursue a more independent monetary policy, since exchange rates can adjust. In order to control interest rates the central bank can adjust the money supply or the discount rate, but it gives up control over the exchange rate. As a result, sectors that are dependent on international trade (such as agriculture) are exposed to more exchange rate variability.

The linkage between the exchange rate and interest rates is found in the concept of interest rate parity.<sup>4</sup> In market equilibrium, changes in the nominal exchange rate ( $e$ ) are due to changes in the real exchange rate ( $E$ ) and the difference between the inflation rates in the foreign and domestic countries,  $\pi_F$  and  $\pi_D$ , respectively. Accordingly,

$$(1) \quad \Delta e / e = \Delta E / E + \pi_F - \pi_D .$$

Thus, either of two factors may lead to an appreciation of the nominal dollar exchange rate - an increase in the relative price of U.S. exports (a real exchange rate appreciation) due to increased foreign demand, or a decrease in the domestic rate of inflation. Given the domestic nominal interest rate ( $r_D$ ) and the foreign nominal interest rate ( $r_F$ ), the interest rate parity condition is

$$(2) \quad r_D = ( r_F - \Delta e / e ) .$$

Here, the impact of macroeconomic policies on the domestic rate of inflation is of importance. Assuming the real exchange rate ( $E$ ) remains unchanged, an increase in the domestic inflation rate relative to the foreign inflation rate leads to a depreciation of the nominal exchange rate (and a corresponding increase in the domestic nominal interest rate). Conversely, policies that reduce the rate of domestic inflation have the effect of appreciating the domestic currency and reducing the nominal interest rate.

By following a relatively restrictive monetary policy in recent years, the U.S. has experienced a relatively low rate of inflation and with it relatively stable nominal interest rates. This has occurred in spite of changes in the economy (tighter labor markets and recent energy price increases) that might have otherwise touched off an escalation of domestic inflation. Several factors have contributed to the slow rate of price increase. One factor has been the rise in the rate of productivity growth relative to the rate of money growth (Greenspan). The increase in domestic productivity has also had the effect

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<sup>3</sup> For example, the real exchange rate depends on the level of real GDP in the U.S. relative to the foreign country and the level of real interest rates in the U.S. relative to the foreign country (Abel and Bernanke).

<sup>4</sup> Uncovered interest rate parity refers to the idea that in equilibrium the rates of return on comparable assets should be equalized throughout the world since money is fungible. Of course, for this to occur we must have highly efficient capital markets.

of raising the real and nominal exchange rates. Low inflation, a strong dollar and increased credit availability have been the result.

Second, we consider the role of fiscal policy in an open economy. An expansionary fiscal policy (e.g., government spending outpacing government tax revenues) represents an increase in aggregate demand. Through that mechanism, an increase in government spending or a decrease in taxes may raise the level of domestic prices and the rate of interest at home. Of course, this depends on the state of the economy. If the economy is operating significantly under its full employment capacity, the impact of a fiscal expansion may be to induce economic growth with no significant pressure on domestic prices. However, a large fiscal stimulus at the full employment level would result in increased inflation. Based on our earlier analysis, this would lead to a depreciation of the nominal exchange rate.

If exchange rates adjust in response to changes in monetary and/or fiscal policy, what does that imply for trade? As the exchange rate adjusts to market forces, it has potential short-run effects and long-run effects on the demand for U.S. exports and imports. If the exchange rate appreciates, it has the potential effect of reducing the international demand for U.S. products. In effect the price of the domestic product increases in terms of the foreign currency. This decreases foreign exchange earnings and reduces income in the affected sectors. As we shall see, there are direct and indirect effects for sectors such as agriculture.<sup>5</sup>

### **Agriculture in the Open Economy**

In order to systematically consider the effects of macroeconomic and trade policy on agriculture in the current environment, we look first at the short-run effects of monetary and fiscal policy. It is assumed that the short-run effects are typically reflected by changes in farm prices, net incomes, asset values, and certain forms of capital investment. Thus, the effects are expected to be largely financial in nature. Secondly, we briefly consider the role of productivity growth as a factor that influences the competitiveness of U.S. agriculture in international markets.

#### *Macroeconomic Policies*

Monetary policy affects agriculture through several alternative channels: interest rates, exchange rates, and credit availability. We are currently observing an easing of monetary policy with the recent drop of 1% in the target federal funds rate (and corresponding decrease in the discount rate) by the Federal Reserve Board. The reasons given for this easing is that during the last few months the economy has shown signs of recession – economic growth has slowed to close to zero and consumer and business confidence have eroded.

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<sup>5</sup> Schuh (1974) found that during the period following World War II, U.S. agriculture responded to an overvalued exchange rate and falling real agricultural prices by making several structural adjustments. Thus, the direct and indirect effects of the fixed exchange rate regime on agriculture were quite significant.

Generally, the expected short-run effects of an easing of monetary policy are to reduce interest rates, increase credit availability and reduce the exchange rate. The first two factors have direct effects on agriculture and the latter factor has an indirect effect. Compared to what we would have seen without such an adjustment, we expect the change in Fed policy to result in an improvement in the domestic and export demand for crops, a net increase in crop prices, and an increase in domestic input prices. The direct positive impacts on agriculture may include lower interest rates and higher net income. Higher incomes and lower rates provide farmers with more options to refinance or pay down their existing debts. Alternatively, if these improved conditions persist, we could see lower long-term rates and increases in capital investment and asset values (Table 2). While the effect on the crop sector is expected to be generally positive the effect on livestock prices is potentially negative, since higher crop prices reduce the net incomes and the demand of livestock producers.

Concerning credit availability, the effect of easier monetary conditions would appear to be partially offset by stricter lending standards of banks and a general tightening of credit conditions. Recent changes in lending standards of banks lending to large and medium-sized firms (and to a lesser extent to small firms) are occurring at a faster pace than any time since the 1990-91 recession (Ip). This occurs at a time when the balance sheets of banks and other agricultural lenders such as the Farm Credit System are generally much stronger than they were 10 years ago.

The impacts of fiscal policy on the agricultural economy are largely indirect in nature and the effects are more ambiguous. The commodity price effects depend on the U.S. market share of export demand and the magnitude of the price elasticity of demand for U.S. farm exports. It is not clear that there is any significant indirect impact on credit availability in agriculture. In Table 2, we assume that U.S. crop exports represent a sufficiently large share of the export market and they have a relatively high price elasticity of export demand.<sup>6</sup>

Current policy discussions indicate that an expansionary fiscal policy is likely to occur over several years through a broad-based personal tax cut. The impact of such a general tax cut on agriculture is largely indirect and depends on the size and timing of the tax cut. If the tax cut is significantly smaller than the \$1.6 trillion suggested by the Bush administration and/or the implementation is gradual, the implied increase in the rate of inflation due to an increase in aggregate demand is likely to be small. This would occur given the current slow rate of economic growth in the U.S., the possibility of a delay in the tax cut, and/or the likely position that the Fed would take to control inflation. Thus, the short-run impact of the anticipated fiscal stimulus on interest rates and the exchange rate are not likely to be large. If the tax cut were to put upward pressure on domestic interest rates, an increase in the exchange rate would result, leading to a reduction of

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<sup>6</sup> Bredahl et al. provide estimates that the price elasticity of export demand for U.S. farm commodities is likely to be somewhat inelastic due to policies in importing countries that protect their markets from U.S. products. The literature consistently shows that the demand is somewhat inelastic.

export demand for U.S. farm commodities. If the increase in domestic demand (due to the fiscal stimulus) does not offset the decline in export demand, the negative net effect on crop prices would result in lower net income in the crop sector and lower asset values. Lower incomes and higher interest rates contribute to a reduction of capital investment in agriculture.

These short-run effects of monetary or fiscal policy have been identified based on underlying supply and demand relationships. The corresponding long-run implications of changing macroeconomic policy for incomes and asset values in agriculture depend on the productivity of resources in agriculture relative to the productivity in the other sectors that compete for domestic and international capital.

If we compare rates of growth of output as indicators of aggregate productivity, we see that the real GDP growth rate in agriculture has lagged behind the rest of the economy and the trend has been downward (Figure 1). One estimate places the annual real growth rate of agriculture at about 0.25 percent during 1949-1991 (Gopinath and Roe). Several factors have played a role in the determination of this slow real agricultural output growth rate. A key factor has been the growth of total factor productivity (i.e., productivity). When evaluated at constant prices the increase in agricultural output due to improved productivity would have been about 2.3 percent. However, the domestic terms of trade for agriculture worsened during this period, as measured by the decline of agricultural prices relative to the prices of goods and services. The result was the slow real rate of growth in U.S. agriculture.

One study estimates that about 50 percent of productivity growth in agriculture is attributed to public investments in agricultural research and development (R&D) and infrastructure. Private investments in agricultural R&D contributed about 25 percent, and the remaining 25 percent is attributed to R&D expenditures in the rest of the economy (Gopinath and Roe). At the same time, annual growth in public agricultural research and development investments have decreased from about 6 percent in the 1960's to 2 percent in 1990's.

If agriculture is to stay competitive in international markets and continue its growth, additional productivity improvements will need to occur. The slowing of productivity in agriculture implies that rates of return will decline and new capital in the domestic and international economy will be bid away from agriculture.

### *Agricultural Trade Policies*

If we look at the history of the dollar exchange rate and U.S. agricultural exports, we observe that there is clearly an inverse relationship between the level of exports and the exchange rate (Figure 2). Yet, studies show that agricultural exports are not highly sensitive to changes in the exchange rate.<sup>7</sup> This implies that even a major depreciation of

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<sup>7</sup> Shane indicates that the exchange rate elasticity of farm exports is approximately  $-0.25$ , ignoring the indirect effects of changes in exchange rates on the prices of farm inputs. Thus, a one percent increase in the exchange rate leads to an approximate 0.25 percent decrease in the

the dollar would result in a relatively small increase in total agricultural exports. However, this may not be the case for trade in specific commodities since commodities in the crop sector (e.g., wheat, rice, corn, soybeans and cotton) may be more sensitive to changing international demand and exchange rates than others.

The international financial crisis of 1997-98 increased U.S. agricultural imports and decreased agricultural exports (Figure 3). It also raised concerns that financial instability could have an effect on the volatility of exchange rates and the volume of exports. A look at volatility of nominal and real exchange rates indicates that with the exception of a couple of years in the latter 1980s, volatility of the dollar exchange rate has been confined to less than 10 percent annually (Figure 4). In addition most studies do not find evidence of a strong link between agricultural trade and exchange rate volatility (Langley et al.). Moreover, we do not currently have evidence of differences in the sensitivity of specific farm commodities to exchange rate volatility.

The recent rise in U.S. agricultural imports is attributed to a decrease in world commodity prices during the latter 1990s. The corresponding decline in the value of U.S. agricultural exports is primarily due to a drop in world demand and a corresponding drop in the prices of exports (Shane and Liefert).<sup>8</sup> The decline in world demand is linked to sharply lower exchange rates and incomes in the countries experiencing financial crisis. Exchange rate volatility *per se* did not appear to play a significant role.

U.S. agriculture has been recently exposed to international market volatility through the sharply rising price of energy. For example, the shock imposed by the current oil and natural gas price increase has a potentially large effect on agricultural sector profits in 2001 through the escalation of fuel prices and the anticipated sharp rise in the cost of fertilizer.

Trade barriers have continued to fall in the 1990s, but world agricultural markets are still distorted (Organization for Economic Cooperation and Development). In 2000, some OECD countries made greater use of export subsidies, export credits and other export-enhancing policies in response to downward pressure on world commodity prices. The U.S. has taken the policy position that trade liberalization has net benefits for U.S. farmers due to the superior operating efficiency of the sector. This policy is embodied in both our policy position towards the World Trade Organization (WTO) and our participation in the North American Free Trade Association (Council of Economic Advisers, 2001). Both trade arenas provide benefits and costs for U.S. agriculture. One of the more anticipated trade developments is the accession of China to the WTO. Based on the 1999 bilateral trade agreement with the U.S., China's wheat imports from the U.S. are projected to increase significantly by 2005 (Koo).

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real value of agricultural exports.

<sup>8</sup> Bredahl et al. estimate the price elasticity of export demand for the major U.S. agricultural commodities. After including the effects of trade distortions on price transmission, the estimated price elasticities of demand are likely to be somewhat inelastic.

The impacts of NAFTA on U.S. agriculture are also an important dimension of our evolving agricultural trade situation since 1994. The structural effects of these trade agreements take time to unfold. However, the preliminary evidence shows that the net effect of trade liberalization under NAFTA on overall U.S. commodity markets has been slightly positive (Secretary of Agriculture). The effect of NAFTA appears to have been to increase the competitiveness of U.S. agriculture by reducing border protection. NAFTA's largest impacts occurred in the products that faced high initial barriers. Data on overall trade with Mexico and Canada clearly shows that U.S. imports have outpaced exports to those countries. Thus, our overall U.S. trade deficit has increased during the NAFTA years. The increase in the trade deficit appears to be in large part attributable to the depreciation of the peso and the Canadian dollar relative to the U.S. dollar (Krueger).

### **Implications for Farmers and Lenders**

With increased use of debt financing and increased dependence on export markets, U.S. agriculture is sensitive to changes in interest rates and exchange rates. These rates are interrelated and changes are transmitted quickly through an efficient set of international currency and capital markets. U.S. macroeconomic policies that alter interest rates and the rate of inflation have an impact on exchange rates and, thereby, the export demand for farm products.

Current economic policy initiatives include an easing of monetary conditions and a planned tax cut in order to offset the current economic slowdown. Both policies should be good medicine for agriculture, as they potentially stimulate domestic and export demand for farm products. Since the current economic slowdown is not confined to the U.S. alone, these policies could have a positive impact on the economies of our trading partners and further stimulate trade. While the short-term implications for agriculture are slightly positive, the long-term picture is less so. The domestic and international competitiveness of U.S. agriculture depends fundamentally on further productivity growth in the sector. Productivity in agriculture has declined in nominal and real terms since the 1960s. Policies need to be considered that will stabilize and/or reverse this trend.

Given the potential for greater market volatility in an open economy, it is important for producers and lenders to consider ways to evaluate and respond to this changing risk environment. I will mention three aspects.

First, the focus of risk management in this environment must be on the strategic risks. Those risks include political, macroeconomic, trade, social and natural contingencies. The dilemma is that these strategic risks are often multidimensional in nature and their consequences cannot be totally managed through conventional means such as futures contracts or insurance instruments (Boehlje and Lins). Thus, farmers and lenders may have relatively few ways in which to hedge the risks that emanate from international markets and financial crises. In the case of agricultural lenders, these factors lead to broader (covariant) risks in their loan portfolios. Thus, producers and lenders need to develop creative approaches that emphasize flexibility, adaptability and diversification.



For example, lenders are exploring alternative methods of quantifying credit risk at the portfolio level and using active portfolio management strategies to manage the risks. We have seen that macroeconomic policy is an important factor in changing market interest rates, exchange rates and general economic conditions in agriculture. Thus, it is important for lenders to incorporate information about the impacts of these policies and economic conditions into an assessment of the expected losses in their loan portfolios.

In order to quantify credit risk in a portfolio one can decompose it into transaction risk, intrinsic risk and concentration risk (McKinley and Barrickman). Transaction risk focuses on the variability of credit quality and the volatility of earnings of individual borrowers. Thus, the emphasis is on measuring individual credit risk. Intrinsic risk reflects the potential for portfolio deterioration due to historical, predictive, and lending risk components – the predictive aspects of which reflect the sensitivities of commodity groups to macroeconomic and trade policies. Here the emphasis is on measuring credit risk in an industry. Concentration risk is the aggregation of the transaction and intrinsic risk measures to reflect the implied correlation of individual and industry risks. In order to assess overall portfolio credit risk exposure it is important for lenders to develop a quantitative risk profile based on all three of these risk components.

Second, producers and lenders need to consider the fact that the Internet Age has changed the speed of response in the domestic and international economy, particularly with respect to changes in the policy arena. For example, companies are more instantaneously informed about their inventory levels and managers can make faster assessments and adjustments to liquidate excess inventories in an economic downturn. Thus, the response to changes in monetary policy occurs more rapidly and the economic and financial effects of policy are transmitted through the economy faster than they were previously. This means that turns in the business cycle are likely to be sharper, and they provide decision makers less time to adjust to the new economic environment. Both producers and lenders need to be aware that their management response times need to be shortened and flexibility needs to be increased. This implies a greater need for liquidity in the agricultural sector.

Third, it is important for producers and lenders to recognize that the indirect effects of changing macroeconomic and trade policies on agriculture are typically larger than the direct effects. These indirect effects are transmitted to agriculture through domestic and international markets in which sensitivities to U.S. policy changes may vary significantly. The crop and livestock sectors of the U.S. agricultural economy are likely to differ in their sensitivities to macroeconomic and trade policy adjustments. Thus, an appropriate analysis of policy impacts must look within agriculture to see the distribution of these economic and financial consequences.

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**Table 1. Trade-to-Income Indices, 1960-99.**

Period	U.S. Total	U. S. Agriculture
Decade Averages:		
1960-1969	9.4%	47.1%
1970-1979	14.8%	64.3%
1980-1989	18.7%	85.6%
1990-1999	22.3%	96.0%
Detail:		
1995	23.3%	118.3%
1996	23.5%	102.0%
1997	24.4%	106.2%
1998	23.8%	110.8%
1999p	24.3%	95.2%

Source: Derived from *Economic Report of the President, 2000*.

**Table 2. Short-Run Effects of Macroeconomic Policy Actions on Agriculture.**

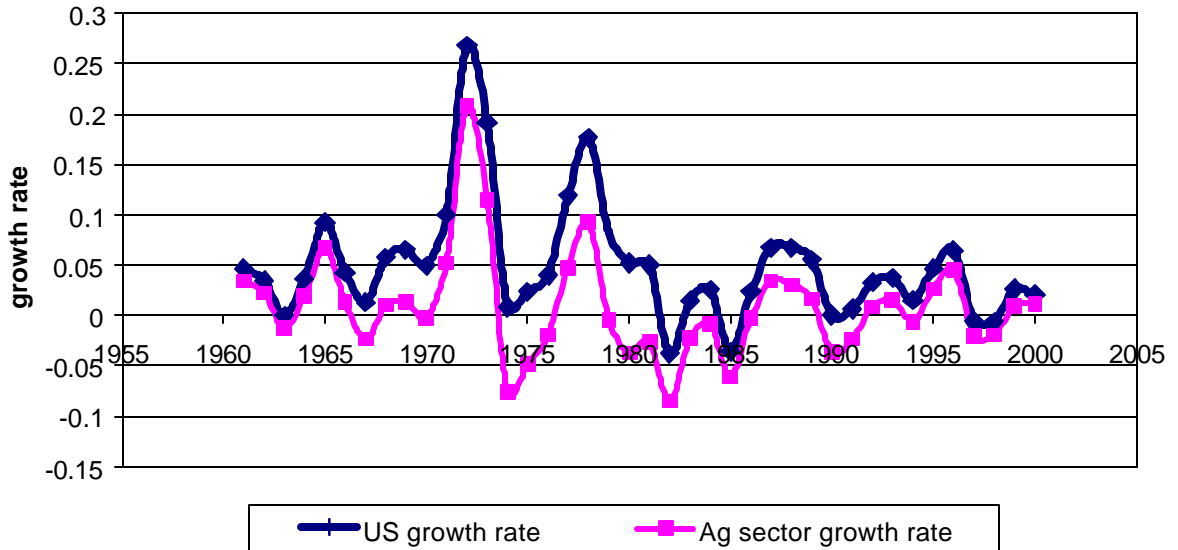
Effects of Policy On Farm:	Expansionary Policy		Contractionary Policy	
	Monetary Policy	Fiscal Policy	Monetary Policy	Fiscal Policy
Crop Prices:				
Domestic Demand	Higher	Higher	Lower	Lower
Export Demand	Higher	Lower	Lower	Higher
Net Impact	Higher	Lower a/	Lower	Higher a/
Livestock Prices	Lower	Higher a/	Higher	Lower a/
Input Prices	Higher	Higher	Lower	Lower
Interest Rates	Lower	Higher	Higher	Lower
Net Income	Higher	Lower b/	Lower	Higher b/
Real Estate Prices	Higher	Lower b/	Lower	Higher b/
Capital Investment	Higher	Lower	Lower	Higher

a/ The effect could be lower or higher. This effect assumes a relatively high market share for exports and a relatively high price elasticity of export demand.

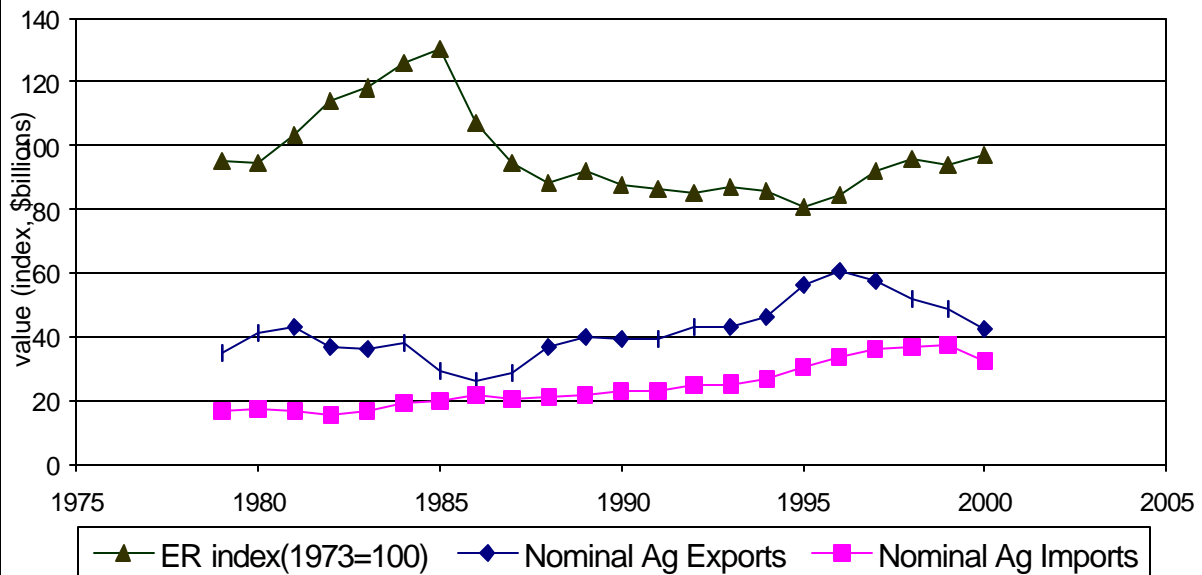
b/ Assumes the impact on crop prices and interest payments offsets the impact on livestock prices. Government payments are assumed to be constant.

Source: Adapted from Penson and Ellinger.

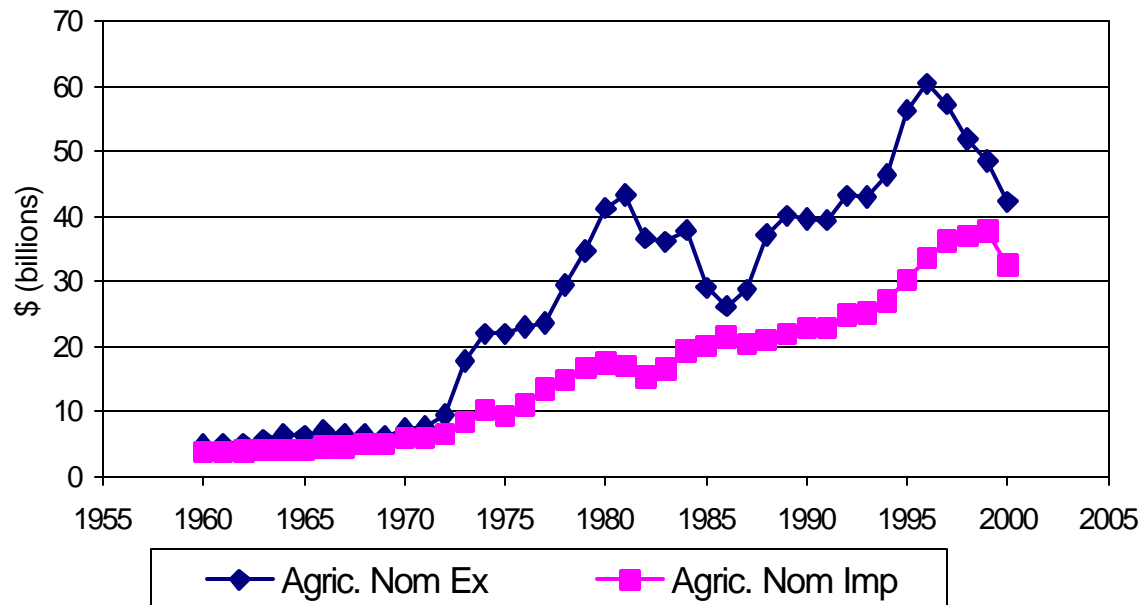
**Figure 1. Real Growth Rates of US and Ag Sector GDP**



**Figure 2. Exch. Rate, Ag. Exports and Imports**



**Figure 3. Nominal Ag. Exports and Imports**



**Figure 4. Volatility of Nominal Exchange Rate**

